

WHAT IS CLAIMED IS:

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1. An internal unit incorporated in a body of a submarine apparatus, the unit comprising:  
a plurality of system units placed in a predetermined arrangement, the system units  
including at least one electronic-circuit printed board having a part to be adjusted; and  
coupling bars fixed to coupling-bar fixing surfaces of said system units by screws so as to couple said system units in said predetermined arrangement,  
wherein said coupling-bar fixing surfaces are located at positions shifted from said electronic-circuit printed board.

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25 2. An internal unit incorporated in a body of a submarine apparatus, the unit comprising:  
a plurality of system units placed in a predetermined arrangement, the system units including an optical-fiber containing portion containing an optical fiber, an electric-supply-line containing portion containing an electric-supply line, and at least one electronic-circuit printed board having a part to be adjusted; and  
coupling bars fixed to coupling-bar fixing surfaces of said system units by screws so as to couple said system units in said predetermined arrangement,  
30 wherein said coupling-bar fixing surfaces are located at positions shifted from said optical-  
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fiber containing portion, said electric-supply-line containing portion, and said electronic-circuit printed board.

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3. The internal unit as claimed in claim  
1, wherein each of said system units has inclined  
10 surfaces on both sides thereof; and  
said inclined surfaces form said coupling-  
bar fixing surfaces.

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4. The internal unit as claimed in claim  
2, wherein each of said system units has inclined  
surfaces on both sides thereof; and  
20 said inclined surfaces form said coupling-  
bar fixing surfaces.

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5. The internal unit as claimed in claim  
1, further comprising a plurality of covers fixed to  
said coupling bars by screws so that each of said  
covers lies across the coupling bars adjacent in a  
30 circumferential direction,  
wherein the covers adjacent in the  
circumferential direction are placed so as to form a  
gap therebetween, the gap being located at a  
position opposing each of said screws fixing said  
35 coupling bars.

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6. The internal unit as claimed in claim  
2, further comprising a plurality of covers fixed to  
said coupling bars by screws so that each of said  
covers lies across the coupling bars adjacent in a  
5 circumferential direction,

wherein the covers adjacent in the  
circumferential direction are placed so as to form a  
gap therebetween, the gap being located at a  
position opposing each of said screws fixing said  
10 coupling bars.

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15 7. The internal unit as claimed in claim  
1, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
including a power-supply module, and a control  
20 circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit  
being stacked on each other, and  
said control circuit unit includes a  
printed board used for adjusting and address-setting  
25 mounted on an outer surface thereof.

30 8. The internal unit as claimed in claim  
2, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
including a power-supply module, and a control  
35 circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit  
being stacked on each other, and

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said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

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9. The internal unit as claimed in claim 3, wherein each of said system units comprises an 10 optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit 15 being stacked on each other, and  
              said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

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10. The internal unit as claimed in claim 4, wherein each of said system units comprises an 25 optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit 30 being stacked on each other, and  
              said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

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11. The internal unit as claimed in claim  
5, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
5 including a power-supply module, and a control  
circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit  
being stacked on each other, and  
said control circuit unit includes a  
10 printed board used for adjusting and address-setting  
mounted on an outer surface thereof.

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12. The internal unit as claimed in claim  
6, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
20 including a power-supply module, and a control  
circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit  
being stacked on each other, and  
said control circuit unit includes a  
25 printed board used for adjusting and address-setting  
mounted on an outer surface thereof.

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13. The internal unit as claimed in claim  
1, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
35 including a power-supply module, and a control  
circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit

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being stacked on each other,

said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

- 5           said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

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14. The internal unit as claimed in claim  
15 2, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-  
20 supply circuit unit and the control circuit unit being stacked on each other,

- said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and  
25           said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

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15. The internal unit as claimed in claim  
35 3, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit

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including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

5           said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

10          said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

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16. The internal unit as claimed in claim 4, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

25          said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and

30          said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

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17. The internal unit as claimed in claim

5, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
including a power-supply module, and a control  
5 circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit  
being stacked on each other,  
                said control circuit unit includes a  
printed board used for adjusting and address-setting  
10 mounted on an outer surface thereof, and  
                said control circuit unit has a  
trapezoidal shape when viewed in a longitudinal  
direction so as to form said coupling-bar fixing  
surfaces on both sides thereof, the coupling-bar  
15 fixing surfaces being inclined in a form of a roof.

20                 18. The internal unit as claimed in claim  
6, wherein each of said system units comprises an  
optical circuit unit including an optical circuit  
component module, a power-supply circuit unit  
including a power-supply module, and a control  
25 circuit unit, the optical circuit unit, the power-  
supply circuit unit and the control circuit unit  
being stacked on each other,  
                said control circuit unit includes a  
printed board used for adjusting and address-setting  
30 mounted on an outer surface thereof, and  
                said control circuit unit has a  
trapezoidal shape when viewed in a longitudinal  
direction so as to form said coupling-bar fixing  
surfaces on both sides thereof, the coupling-bar  
35 fixing surfaces being inclined in a form of a roof.

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19. A submarine apparatus comprising:  
a cylindrical airtight body; and  
an internal unit incorporated in said body,  
the internal unit including:  
5        a plurality of system units placed in a  
predetermined arrangement, the system units  
including at least one electronic-circuit printed  
board having a part to be adjusted; and  
coupling bars fixed to coupling-bar fixing  
10      surfaces of said system units by screws so as to  
couple said system units in said predetermined  
arrangement,  
wherein said coupling-bar fixing surfaces  
are located at positions shifted from said  
15      electronic-circuit printed board.
- 20      20. A submarine apparatus comprising:  
a cylindrical airtight body; and  
an internal unit incorporated in said body,  
the internal unit including:  
a plurality of system units placed in a  
25      predetermined arrangement, the system units  
including an optical-fiber containing portion  
containing an optical fiber, an electric-supply-line  
containing portion containing an electric-supply  
line, and at least one electronic-circuit printed  
board having a part to be adjusted; and  
coupling bars fixed to coupling-bar fixing  
surfaces of said system units by screws so as to  
couple said system units in said predetermined  
30      arrangement,  
wherein said coupling-bar fixing surfaces  
35      are located at positions shifted from said optical-  
fiber containing portion, said electric-supply-line

containing portion, and said electronic-circuit printed board.

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21. The submarine apparatus as claimed in  
claim 19, wherein each of said system units has  
inclined surfaces on both sides thereof; and  
10                 said inclined surfaces form said coupling-  
bar fixing surfaces.

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22. The submarine apparatus as claimed in  
claim 20, wherein each of said system units has  
inclined surfaces on both sides thereof; and  
said inclined surfaces form said coupling-  
20 . bar fixing surfaces.

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25               23. The submarine apparatus as claimed in  
claim 19, further comprising a plurality of covers  
fixed to said coupling bars by screws so that each  
of said covers lies across the coupling bars  
adjacent in a circumferential direction,  
30               wherein the covers adjacent in the  
circumferential direction are placed so as to form a  
gap therebetween, the gap being located at a  
position opposing each of said screws fixing said  
coupling bars.

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24. The submarine apparatus as claimed in  
claim 20, further comprising a plurality of covers  
fixed to said coupling bars by screws so that each  
of said covers lies across the coupling bars  
5 adjacent in a circumferential direction,  
wherein the covers adjacent in the  
circumferential direction are placed so as to form a  
gap therebetween, the gap being located at a  
position opposing each of said screws fixing said  
10 coupling bars.

15 25. The submarine apparatus as claimed in  
claim 19, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply  
circuit unit including a power-supply module, and a  
20 control circuit unit, the optical circuit unit, the  
power-supply circuit unit and the control circuit  
unit being stacked on each other, and  
said control circuit unit includes a  
printed board used for adjusting and address-setting  
25 mounted on an outer surface thereof.

30 26. The submarine apparatus as claimed in  
claim 20, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply  
circuit unit including a power-supply module, and a  
35 control circuit unit, the optical circuit unit, the  
power-supply circuit unit and the control circuit  
unit being stacked on each other, and

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said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

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27. The submarine apparatus as claimed in claim 21, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit 15 unit being stacked on each other, and  
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said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

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28. The submarine apparatus as claimed in claim 22, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit 30 unit being stacked on each other, and  
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said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof.

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29. The submarine apparatus as claimed in  
claim 23, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply  
5 circuit unit including a power-supply module, and a  
control circuit unit, the optical circuit unit, the  
power-supply circuit unit and the control circuit  
unit being stacked on each other, and  
              said control circuit unit includes a  
10 printed board used for adjusting and address-setting  
mounted on an outer surface thereof.

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30. The submarine apparatus as claimed in  
claim 24, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply  
20 circuit unit including a power-supply module, and a  
control circuit unit, the optical circuit unit, the  
power-supply circuit unit and the control circuit  
unit being stacked on each other, and  
              said control circuit unit includes a  
25 printed board used for adjusting and address-setting  
mounted on an outer surface thereof.

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31. The submarine apparatus as claimed in  
claim 19, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply  
35 circuit unit including a power-supply module, and a  
control circuit unit, the optical circuit unit, the  
power-supply circuit unit and the control circuit

unit being stacked on each other,  
said control circuit unit includes a  
printed board used for adjusting and address-setting  
mounted on an outer surface thereof, and

5           said control circuit unit has a  
trapezoidal shape when viewed in a longitudinal  
direction so as to form said coupling-bar fixing  
surfaces on both sides thereof, the coupling-bar  
fixing surfaces being inclined in a form of a roof.

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32. The submarine apparatus as claimed in  
15 claim 20, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply  
circuit unit including a power-supply module, and a  
control circuit unit, the optical circuit unit, the  
20 power-supply circuit unit and the control circuit  
unit being stacked on each other,

              said control circuit unit includes a  
printed board used for adjusting and address-setting  
mounted on an outer surface thereof, and  
25           said control circuit unit has a  
trapezoidal shape when viewed in a longitudinal  
direction so as to form said coupling-bar fixing  
surfaces on both sides thereof, the coupling-bar  
fixing surfaces being inclined in a form of a roof.

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33. The submarine apparatus as claimed in  
35 claim 21, wherein each of said system units  
comprises an optical circuit unit including an  
optical circuit component module, a power-supply

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circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

- 5           said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and  
              said control circuit unit has a trapezoidal shape when viewed in a longitudinal  
10          direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

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34. The submarine apparatus as claimed in claim 22, wherein each of said system units comprises an optical circuit unit including an  
20          optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,  
25          said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and  
              said control circuit unit has a trapezoidal shape when viewed in a longitudinal  
30          direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar fixing surfaces being inclined in a form of a roof.

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35. The submarine apparatus as claimed in

claim 23, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

5                 said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and  
10                 said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar  
15                 fixing surfaces being inclined in a form of a roof.

20                 36. The submarine apparatus as claimed in claim 24, wherein each of said system units comprises an optical circuit unit including an optical circuit component module, a power-supply circuit unit including a power-supply module, and a control circuit unit, the optical circuit unit, the power-supply circuit unit and the control circuit unit being stacked on each other,

25                 said control circuit unit includes a printed board used for adjusting and address-setting mounted on an outer surface thereof, and  
30                 said control circuit unit has a trapezoidal shape when viewed in a longitudinal direction so as to form said coupling-bar fixing surfaces on both sides thereof, the coupling-bar  
35                 fixing surfaces being inclined in a form of a roof.